

REMARKS

Claims 1, 4, 7 and 8 are pending in this Application. The specification has been amended to address a manifest typographical oversight as noted by the Examiner. Claims 2, 3, 5 and 6 have been cancelled. Claims 1 and 4 have been amended and new claims 7 and 8 added. Care has been exercised to avoid the introduction of new matter. Indeed, adequate descriptive support for the present Amendment should be apparent throughout the originally filed disclosure noting, for example, Fig. 2 and the related discussion thereof in the written description of the specification. Applicants submit that the present Amendment does not generate any new matter issue.

Objection to the Specification

The Examiner objected to the specification noting an apparent typographical oversight on page 5, line 3, and courteously noted an appropriate change. The specification has been amended consistent with the Examiner's comments, thereby overcoming the stated basis for the objection. Accordingly, withdrawal of the objection to the specification is solicited.

Claim Objection

The Examiner objected to claims 4 and 6, asserting that the term "insulator" must be specified as to whether it is a thermal insulator or electrical insulator. This objection is traversed.

The Examiner has offered no reason why, and it is inconceivable that, one having ordinary skill in the art would have any difficulty understanding the scope of the term "insulator" when reasonably interpreted in light of and consistent with the written description of the

specification, which is the judicial standard. *Miles Laboratories, Inc. v. Shandon, Inc.*, 997 F.2d 870, 27 USPQ2d 1123 (Fed. Cir. 1993).

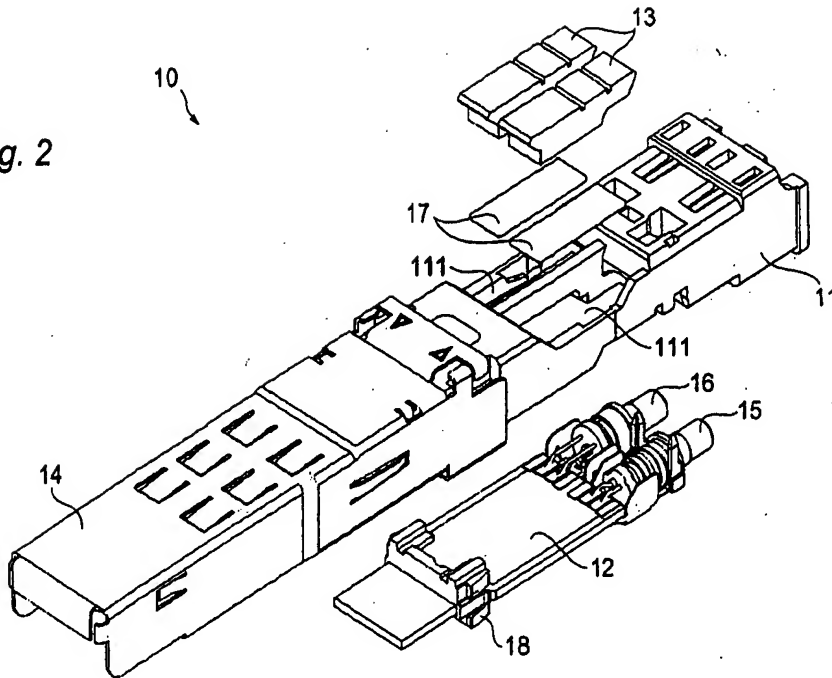
At any rate, in order to expedite prosecution, claim 4 has been amended by changing “insulator” to “resin”, and claim 6 has been cancelled. Accordingly, withdrawal of the claim objection is solicited.

Claims 1 and 3 through 6 were rejected under 35 U.S.C. § 103 for obviousness predicated upon Sato et al. in view of Miller et al.

In the statement of the rejection the Examiner admitted that Sato et al. do not disclose that the cover is made of metal. However, the Examiner concluded that one having ordinary skill in the art would have been motivated to modify the module disclosed by Sato et al. by providing a metal cover in view of Miller et al. This rejection is traversed.

There are functionally significant structural differences between the claimed module and the module disclosed by the prior art that undermine the obviousness conclusion under 35 U.S.C. § 103.

Fig. 2



For the Examiner's convenience Fig. 2 of the present Application is reproduced above to facilitate understanding Applicant's arguments regarding the nonobviousness of the claimed invention as a whole. Original claim 1 was directed to an optical module which includes: optical subassemblies, 15 and 16; a substrate 12; a base 11; a cover 14; and a combination of a thermal block 13 and a thermal sheet 17. With continued reference to Fig. 2, an electronic device provided on the substrate, such as a laser-driver for driving the semiconductor laser installed within the TOSA, generates heat. The generated heat is transferred to the cover 14 via the thermal block 13 and the thermal sheet 17, and then emitted to the outside of the module. The thermal block of the present invention is made of metal, such as aluminum, as disclosed in paragraph [0023] of the written description of the specification, and the thermal sheet 17 is made of resin, such as a silicone resin, also disclosed in paragraph [0023].

In order to dissipate heat from the electronic device, it is necessary to provide a heat-dissipating path from the source to the outside. It is also necessary to select materials in the heat-

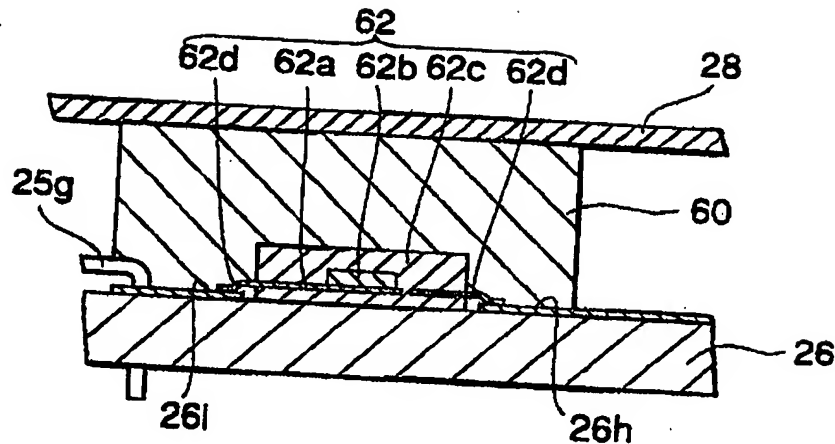
dissipating path with good thermal conductivity, such as a metal. However, when the metallic material is in direct contact with the electronic device, in order to secure the heat-dissipating path, electronic performance of the device is adversely impacted. Accordingly, it is always necessary to provide a metallic material in contact with electrical isolation separating the metallic material from the electronic device. However, such an electrical insulator does not always exhibit good thermal conductivity, hence the problem addressed by the present invention.

In accordance with the present invention, a resin, such as a silicone resin, is employed, which exhibits a thermal conductivity less than the aluminum thermal block. Accordingly, the resin is provided in contact with the electronic device for electrical isolation. However, it is provided with a reduced thickness and the metal block fills a gap between the thermal sheet and the metallic cover formed by the thin metal sheet. In this way an effective heat-dissipating path is formed from the electronic device on the substrate metal cover **without adversely impacting electronic performance of the device.**

Moreover, in order to secure the effective heat-dissipating path, it is necessary for members within the path to come in close contact with each other. Therefore, the thermal block is pressed down to contact the thermal sheet. Advantageously, in accordance with the present invention, **stress** induced by such pressing is **released or relaxed** by the elasticity of the resin. In addition, Applicants would note that the opening 111 of the base has a side surface sloped 111a from the cover to the thermal sheet, which also releases the stress applied to the electronic device.

Based upon the foregoing, it should be apparent that the claimed module is completely different from that disclosed by Sato et al. and the deficiencies are not remedied by the secondary reference to Miller et al.

Fig.12A



For the Examiner's convenience Fig 12A of Sato et al. is reproduced above. The disclosed illustrated electronic device 62 is installed on a circuit board 26, and the heat transfer part 60 is in contact with the molded resin 62c, which covers the semiconductor chip 62b. Electronic device 62, in the above configuration, comprises the semiconductor chip 62b molded with resin 62c. In other configurations, the chip (64b, 66a) is sealed with a sealant resin (64c, 66c).

In imposing the rejection under 35 USC §103 the Examiner identified heat transfer part 60 indicated above in Fig. 12A of Sato et al., asserting it corresponds to the thermal block 13 of the present invention. However, as apparent from paragraphs [0087] and [0088], the heat transfer part 60 may exhibit a certain degree of flexibility to fit various shapes of the electronic device. Accordingly, this heat transfer part 60 may be said to correspond to the thermal sheet 17 of the present invention. **However, any member similar to the thermal block 13 of the present invention does not exist in Sato et al. Further, Sato et al. neither provide nor suggest any members comparable to the base 11 with the opening 111 of the present invention.**

Although the mounting member 22 installs a circuit board 26 thereof in the module of Sato et al., the mounting member **only serves as the bottom plate** for the cover 28.

Accordingly, in the module disclosed by Sato et al., there is **no base** that builds the frame of the optical module and, hence, there is no need to provide a thermal block. This being the case it cannot be said that one having ordinary skill in the art would have been realistically motivated to provide a thermal block where it is not needed.

Based upon the foregoing it should be apparent that the Examiner did not establish a *prima facie* basis to defeat the patentability of original claim 1 under 35 U.S.C. § 103. At any rate, and again in order to expedite prosecution, claim 1 has been amended by clarifying that the base, cover and block are made of metal for dissipating the heat generated by the circuit. Further, claims 1 has been clarified by reciting that a thermal sheet is placed between the thermal block and the circuit, a feature neither disclosed nor suggested by the applied prior art.

Based upon the foregoing it should be apparent that even if the applied references are combined as suggested by the Examiner, and Applicants certainly do not agree that the requisite fact-based motivation has been established, the claimed invention would not result. *Uniroyal, Inc. v. Rudkin-Wiley Corp.*, 837 F.2d 1044, 5 USPQ2d 1434 (Fed. Cir. 1988). Applicants, therefore, submit that the imposed rejection of claims 1 and 3 through 6 under 35 U.S.C. § 103 for obviousness predicated upon Sato et al. in view of Miller et al. is not factually or legally viable and, hence, solicit withdrawal thereof.

Claim 2 was rejected under 35 U.S.C. § 103 for obviousness predicated upon Sato et al. in view of Miller et al. and Harding.

This rejection is traversed. Indeed, this rejection has been rendered moot by canceling claim 2.

New Claims 7 and 8

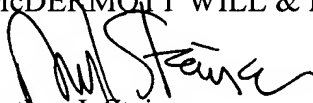
New claims 7 and 8 are free of the applied prior art by virtue of their dependence upon claim 1. The patentability of claim 1 has been argued *supra*.

Based upon the foregoing it should be apparent that the objections and rejections have been overcome, and that all pending claims are in condition for immediate allowance. Favorable consideration is, therefore, solicited.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

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